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Closure Plan for the 207-A South Retention Basin

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States Department of Energy
P.O. Box 550
Richland, Washington 99352

Approved for Public Release;
Further Dissemination Unlimited

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TERMS

AEA	*Atomic Energy Act of 1954*
bgs	below ground surface
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE	U.S. Department of Energy
DST	double-shell tank
Ecology	Washington State Department of Ecology
ETF	Effluent Treatment Facility
LERF	Liquid Effluent Treatment Facility
NA	not applicable
OU	operable unit
QA/QC	quality assurance / quality control
RCRA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
RI Report	*Remedial Investigation Report for the 200-PW-2 Uranium-Rich Process Waste Group and 200-PW-4 General Process Condensate Group Operable Units*, DOE/RL-2004-25
RI/FS	remedial investigation / feasibility study
RI/FS Work Plan	*Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes 200-PW-2 and 200-PW-4 Operable Units*, DOE/RL-2000-60
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*, Ecology et al., 1989
TSD	treatment, storage, and/or disposal (unit)
U	undetected
WAC	*Washington Administrative Code*

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	Millimeters	millimeters	0.039	inches
inches	2.54	Centimeters	centimeters	0.394	inches
feet	0.305	Meters	meters	3.281	feet
yards	0.914	Meters	meters	1.094	yards
miles	1.609	Kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.0836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	Hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	Grams	grams	0.035	ounces
pounds	0.454	Kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	Milliliters	milliliters	0.033	fluid ounces
tablespoons	15	Milliliters	liters	2.1	pints
fluid ounces	30	Milliliters	liters	1.057	quarts
cups	0.24	Liters	liters	0.264	gallons
pints	0.47	Liters	cubic meters	35.315	cubic feet
quarts	0.95	Liters	cubic meters	1.308	cubic yards
gallons	3.8	Liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	Millibecquerel	millibecquerel	0.027	picocuries

1.0 INTRODUCTION

This closure plan is being submitted in accordance with *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989a, as amended) interim milestones. Milestone M-020-00B requires submittal of a closure plan for the 207-A South Retention Basin *Resource Conservation and Recovery Act of 1976* (RCRA) treatment, storage, and/or disposal (TSD) unit by December 31, 2008. Interim milestone M-020-33 in support of M-020 milestones requires submittal of this closure plan to the Washington State Department of Ecology (Ecology) by April 30, 2006. No other closure plan has been submitted for this TSD unit.

The 207-A South Retention Basin was used for interim storage of 242-A Evaporator process condensate for sampling and analysis before the condensate was discharged to the 216-A-37-1 Crib for disposal to the soil column. The basin began storage operations in 1977, and evaporator discharge to the basin was terminated on April 12, 1989. Because the 242-A Evaporator process condensate was designated as dangerous waste under WAC 173-303, "Dangerous Waste Regulations," the 207-A South Retention Basin Part A (Rev. 0), was submitted to Ecology in 1986 (now located in DOE/RL-88-21, *Hanford Facility Dangerous Waste Part A Permit Application*), making the basin subject to RCRA regulations for TSD units. The Part A designated the 207-A South Retention Basin as an interim status surface impoundment.

The 242-A Evaporator process condensate is a mixed waste (Section 3.1). Source, special nuclear, and by-product materials, as defined in the *Atomic Energy Act of 1954* (AEA), are regulated at U.S. Department of Energy (DOE) facilities exclusively by the DOE, acting pursuant to its AEA authority. These materials are not subject to regulation by the State of Washington. All information contained herein and related to, or describing, AEA-regulated materials and processes in any manner, may not be used to create conditions or other restrictions set forth in any permit, license, order, or any other enforceable instrument. The DOE asserts that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear and by-product materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

The basin consists of three separate open liquid-effluent storage cells that operated as a surface impoundment. Under the definition of surface impoundment (WAC 173-303-040, "Definitions"), this unit has no associated ancillary equipment. Consequently, the TSD unit boundary, as shown on the Part A (DOE/RL-88-21), was established as the exterior wall of the concrete basin structure. The scope of closure includes the basin storage cells and subsoils. The waste feed piping from the 242-A Evaporator and basin discharge piping to the 216-A-37-1 Crib are outside the TSD unit boundary and the scope of TSD unit closure. This piping will be addressed in conjunction with either the 200-IS-1 Operable Unit (OU) or through closure of the 242-A Evaporator. The groundwater will continue to be evaluated through the 200-PO-1 Groundwater OU, although a RCRA final status groundwater monitoring plan will not be required for this unit.

The 207-A South Retention Basin was assigned to the process-based 200-PW-4 General Process Condensate Waste Group OU for characterization and remediation under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) remedial investigation/feasibility study (RI/FS) process for this OU. This waste group was low in contaminants and did not qualify for inclusion in other more contaminated waste groups. Because of various similarities of process and waste, this group was consolidated with the 200-PW-2 OU for characterization and remedial decision making (DOE/RL-98-28, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan – Environmental Restoration Program*). TSD unit characterization data were collected in accordance with DOE/RL-2000-60, *Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes 200-PW-2 and 200-PW-4 Operable Units* (Work Plan). Characterization data are provided in DOE/RL-2004-25, *Remedial Investigation Report for the 200-PW2 Uranium-Rich Process Waste Group and the 200-PW-4 General Process Condensate Group Operable Units*, Appendix B) (RI Report). TSD unit closure data are discussed further in Chapter 7.0 of this closure plan.

The proposed closure strategy for the 207-A South Retention Basin structures and soil is clean closure in accordance with WAC 173-303-610, "Closure and Post-Closure." This strategy is based on analytical data provided in the Work Plan (DOE/RL-2000-60), showing that TSD unit vadose zone soil and concrete structures meet clean-closure performance standards (Chapter 6.0) for TSD unit dangerous waste constituents without further physical closure activities. Because the clean-closure strategy is based on the results of completed sampling and analysis described in this closure plan, final approval of this closure plan will constitute approval of TSD unit clean closure. Any other non-TSD unit constituent will be dispositioned through the past-practice processes identified in the Tri-Party Agreement, Chapter 7.0, and the CERCLA RI/FS process for the consolidated 200-PW-2 and 200-PW-4 OUs. These activities will satisfy RCRA corrective requirements under the WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste*, Condition II.Y.

2.0 FACILITY DESCRIPTION

This chapter describes the 207-A South Retention Basin and provides security information from the Work Plan (DOE/RL-2000-60)and the RI Report (DOE/RL-2004-25).

2.1 FACILITY DESCRIPTION AND OPERATIONS

The 207-A-South Retention Basin is located in the 200 East Area (Figure 1) directly east of the 242-A Evaporator. The 207-A South Retention Basin (Figure 2), also known as Process Condensate Basins 1, 2, and 3 (i.e., PC-1, PC-2, and PC-3), began operations in March 1977. The basin consists of three concrete cells, each with a 264,979 L (70,000-gal) design capacity for a total capacity of 794,937 L (210,000 gal). Each cell is 16.8 m (55 ft) long, 3.0 m (10 ft) wide at the bottom, and 2.1 m (7 ft) deep. The bottom of each basin cell slopes toward a drain located at the south end of the cell. All three cells were coated with an elastomeric coating to prevent waste contaminants from penetrating the concrete. These concrete structures have remained intact (i.e., no cracks exist in the basins and no leaks have been reported from the basins) (CP-18666, *200-PW-2 and 200-PW-4 Operable Unit Borehole Summary Report*). Therefore, no pathway to soil exists for the stored waste.

The 207-A South Retention Basin operated as a surface impoundment for the interim storage of the-242-A Evaporator process condensate while the condensate awaited sampling and analysis before being discharged to the 216-A-37-1 Crib for disposal to the soil column. No waste treatment occurred at this unit. Discharge of 242-A Evaporator process condensate to the 207-A South Retention Basin was terminated on April 12, 1989, when the 242-A Evaporator process condensate was determined to contain dangerous waste regulated under WAC 173-303. The basin was emptied and cleaned out in September 1989 and no longer is in use.

2.2 SECURITY INFORMATION

Security information for the Hanford Facility is discussed in DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application*, Section 6.1. Because the 207-A South Retention Basin is located in the 200 East Area, the security information pertaining to the 200 Areas applies to this TSD unit.

A chain-link fence surrounds the 207-A South Retention Basin. Changes to security are expected to occur during the course of 200 East Area deactivation and decommissioning activities. Security measures will remain in place that limit unit entry to authorized personnel and that preclude unknowing access by unauthorized individuals until closure of the TSD unit.

Figure 1. 207-A South Retention Basin Site Plan.

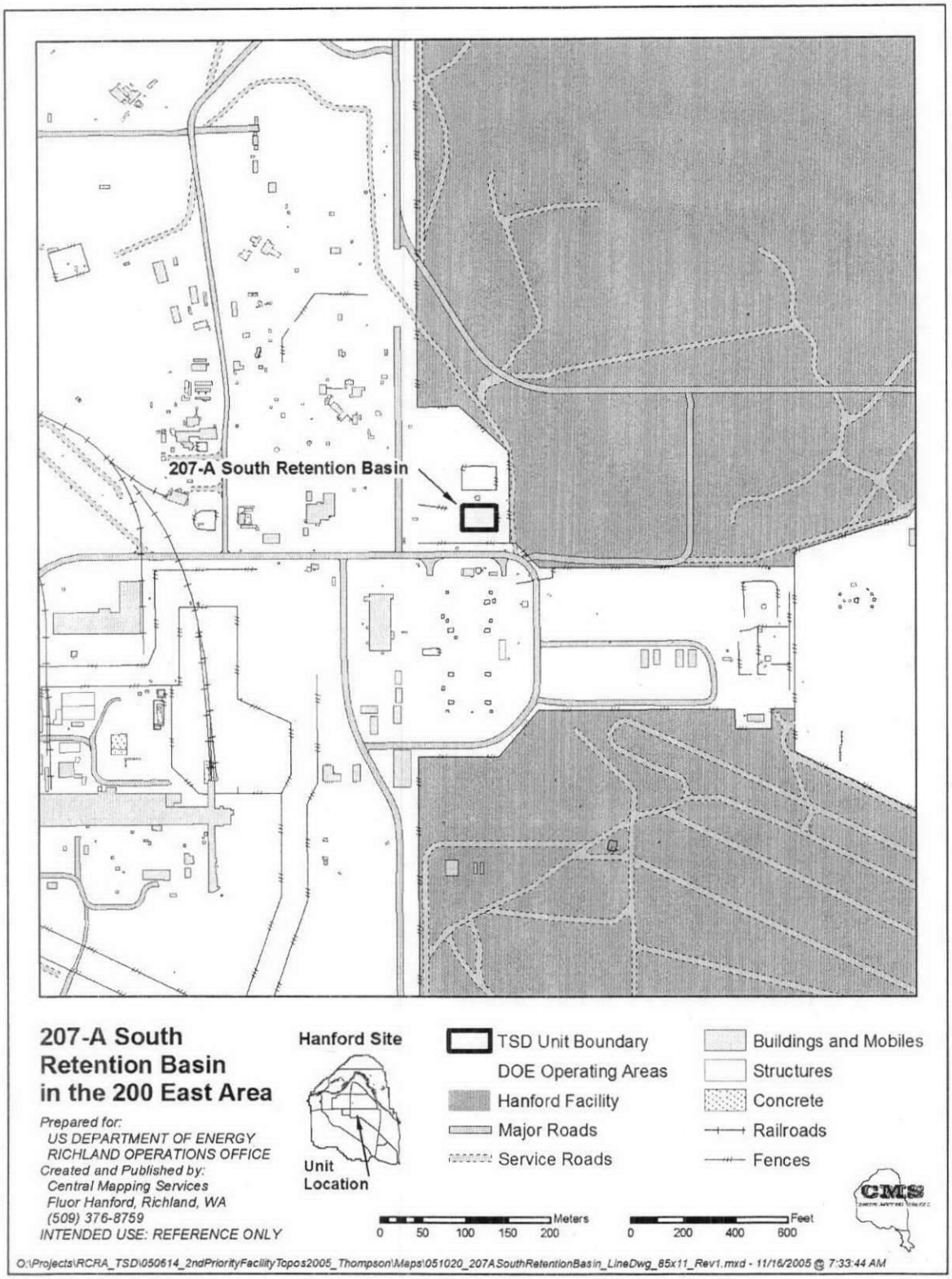
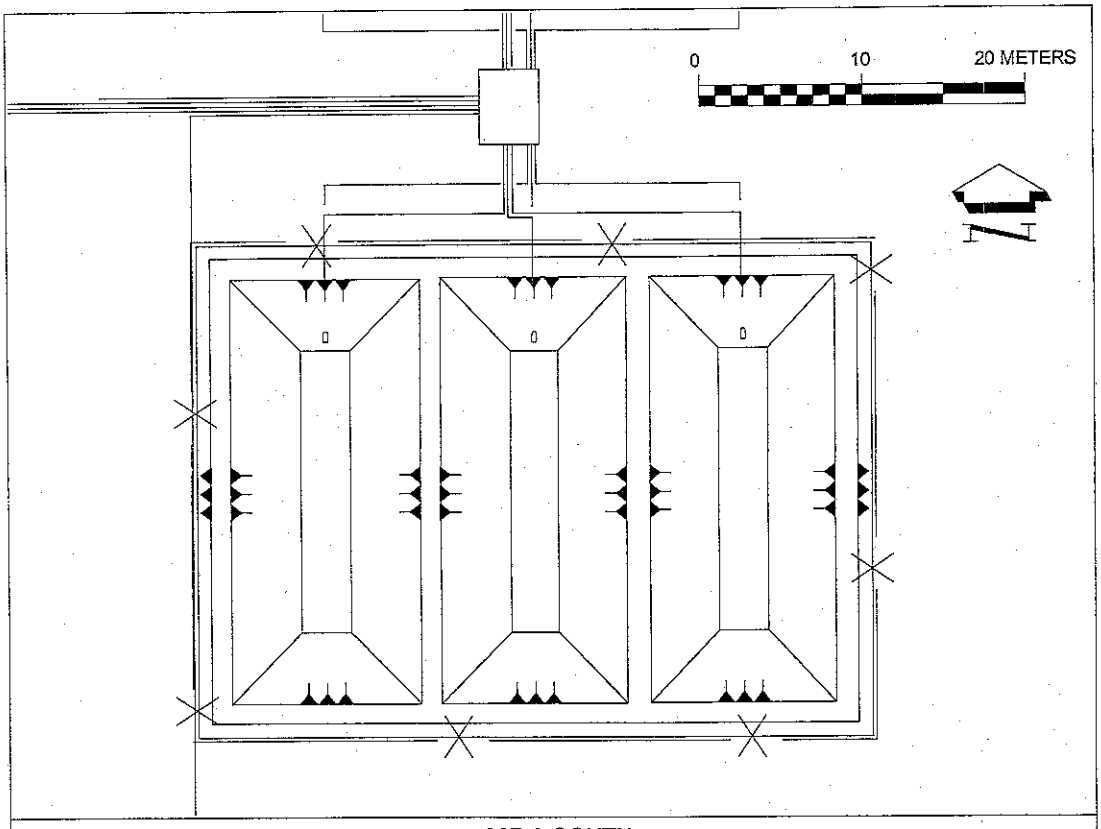
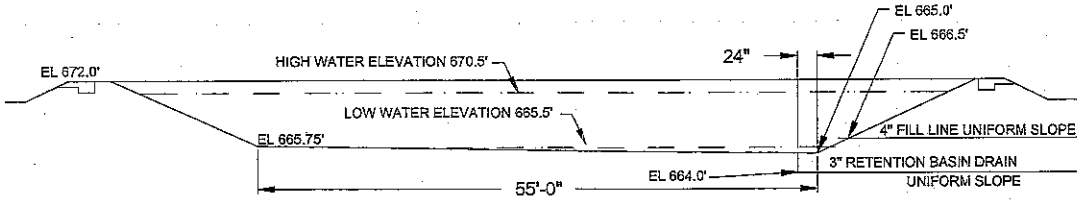


Figure 2. 207-A South Retention Basin Construction Diagram.



207-A SOUTH
PLAN VIEW



207-A SOUTH
SECTION

Note: These drawings represent as-built features and may not reflect current conditions.

U.S DEPARTMENT OF ENERGY DOE FIELD OFFICE, RICHLAND HANFORD ENVIRONMENTAL RESTORATION PROGRAM 082802A	207-A South Retention Basin Plan View and Longitudinal Section

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3.0 PROCESS INFORMATION

This chapter describes the processes that generated the waste received at the 207-A South Retention Basin and the basin storage process.

3.1 WASTE SOURCES AND DESCRIPTION

All waste received by the 207-A South Retention Basin was from the 242-A Evaporator. Waste processed by the 242- A Evaporator is received from the Double-Shell Tank (DST) System and is an aqueous, mixed-waste solution containing dissolved cations and anions such a sodium, potassium, aluminum, hydroxides, nitrates, and nitrites. Slurry and process condensate are the two mixed-waste streams generated at the 242-A Evaporator. The slurry is returned to the DST System. The process condensate is condensed vapor from the evaporation process. During the period of crib operations, process condensate was transferred to the 207-A South Retention Basin for interim storage before it was disposed of at the 216-A-37-1 Crib.

The process condensate was mostly water containing small quantities of ammonia and inorganic constituents and trace quantities of volatile organics and radionuclides (WHC-EP-0342, Addendum 15, *242-A Evaporator Process Condensate Stream-Specific Report*). The RCRA permitting documents for all three associated units (i.e., DST System Part A [DOE/RL-88-21], 242-A Evaporator unit-specific permit conditions [WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste*], and 207-A South Retention Basin Part A [DOE/RL-88-21]) identify the potential for all of these units to have managed the same waste and carry the same dangerous waste numbers.

3.2 TREATMENT, STORAGE, AND DISPOSAL UNIT STORAGE PROCESS

This unit operated as a surface impoundment for interim storage of 242-A Evaporator process condensate while the condensate awaited sampling and analysis. Waste was pumped from the 242-A Evaporator through waste transfer piping to the basins. Waste generally was stored in the basin only long enough to obtain the process control sample results. Pumps located at a pumping station between the 207-A North Retention Basin and the 207-A South Retention Basin were used to transfer the stored effluent to the 216-A-37-1 Crib for disposal to the soil column. No waste treatment occurred at this site.

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4.0 WASTE CHARACTERISTICS

This chapter identifies the inventory and the characteristics of the waste treated and stored at the 207-A South Retention Basin.

4.1 WASTE INVENTORY

The 207-A South Retention Basin operated from 1977 to 1989 and managed only 242-A Evaporator process condensate effluent waste. The total quantity of process condensate waste ever on site at any one time was limited to the combined design capacity of the storage cells of approximately 794,937 L (210,000 gallons). Overall, the site received for storage 377,000,000 L (99,590,000 gal) of evaporator condensate (DOE/RL-98-28).

4.2 WASTE CHARACTERISTICS

The 242-A Evaporator process condensate was designated as mixed waste (WAC 173-303-040), because the waste was derived from a waste containing spent halogenated and nonhalogenated solvents (WAC 173-303, dangerous waste numbers F001, F002, F003, F004, and F005) and because of the toxicity of ammonia (WT02, state-only, toxic, dangerous waste). The 207-A South Retention Basin Part A (DOE/RL-88-21) identifies the compounds and dangerous waste numbers potentially managed at this unit. The TSD unit constituents associated with these dangerous waste numbers are identified on Table 1. Because 242-A Evaporator treatment was limited to evaporation, which did not remove dangerous waste numbers, all of the listed DST System dangerous waste numbers potentially apply to the waste stream discharged to the 207-A South Retention Basin.

Table 1. Comparison of 207-A South Retention Basin Treatment, Storage, and Disposal Unit Constituent Soil Concentrations to WAC 173-340-740(3) Clean-Closure Levels.

Treatment, Storage, and Disposal Unit Constituents	Maximum Concentration (mg/kg)		Hanford Site Soil Background (mg/kg) [a] 90%	Soil Cleanup Level for Human Health Direct Contact [b] (mg/kg)		Soil Concentration Protective of Groundwater [c] (mg/kg)	Clean-Closure Requirement [d]	Meet Clean-Closure Standard?
	Soil	Concrete		Carcinogen	Noncarcinogen			
Ammonia	0.248	U	9.23	NA [e]	NA [e]	NA [e]	Background	Yes
Acetone [g]	0.026	0.120 [f]	NA	NA	72,000	28.9	Protective of groundwater	Yes
Cresol-m [g, h]	U	2.8 [f]	NA	NA	4,000	10.0	Protective of groundwater	Yes
Cresol-o [g, h]	U	1.0 [f]	NA	NA	4,000	10.3	Protective of groundwater	Yes
Cresol-p [g, h]	U	2.8 [f]	NA	NA	400	1.0	Protective of groundwater	Yes
Methylene Chloride [g]	0.005	U	NA	133	4800	0.021	Protective of groundwater	Yes
Methyl Ethyl Ketone [g, h]	U	U						Yes
Methyl Isobutyl Ketone [g, h]	U	U						Yes
Trichloroethane [g]	U	U						Yes

Shaded areas represent information not required for undetected treatment, storage, and disposal unit constituents.

[a] DOE/RL-92-24, Vol. 1, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*.

[b] WAC 173-340-740(3)(b)(iii)(B), "Unrestricted Land Use Soil Cleanup Standards," "Method B Soil Cleanup Levels for Unrestricted Land Use," "Standard Method B Soil Cleanup Levels," "Human Health Protection," "Soil Direct Contact," equations found in Tables 740-1 (carcinogens) and 740-2 (noncarcinogens) for human-health direct contact. Point of compliance is 4.6 m (15 ft) (WAC 173-340-740(6), "Unrestricted Land Use Soil Cleanup Standards," "Point of Compliance").

[c] WAC 173-340-740(3)(b)(iii)(A) directs establishment of soil cleanup levels protective of groundwater using methods described in WAC 173-340-747, "Deriving Soil Concentrations for Ground Water Protection." Point of compliance is soils throughout the site (WAC 173-340-740(6)).

[d] Listed values represent the most restrictive level of the direct exposure and groundwater protection pathways after evaluation of this value to ensure that it is not less than natural background and for analytical considerations as indicated in WAC 173-340-700(6)(d), "Overview of Cleanup Standards," "Requirements for Setting Cleanup Levels," "Natural Background and Analytical Considerations."

[e] Ammonia not regulated under WAC 173-340, "Model Toxics Control Act – Cleanup."

[f] The constituents listed in this column were detected in concrete samples, not detected in vadose zone soil; therefore, these concentrations are not applicable to groundwater.

[g] F001-F005 listed constituents in 242-A Evaporator waste (Part A constituents, Section 7.2.3.1)

[h] Constituents reported under the following synonyms: Cresol-m reported as 3-methylphenol; Cresol-o reported as 2 methylphenol; Cresol-p reported as 4 methylphenol; Methyl ethyl ketone reported as 2-butanone; Methyl isobutyl ketone reported as 4 methyl-2 pentanone (hexone).

NA = not applicable.

U = undetected.

5.0 GROUNDWATER MONITORING

As a surface impoundment and 'regulated unit' under the definitions of WAC 173-303-040, the 207-A South Retention Basin, if still operating, would require RCRA groundwater monitoring under the current interim status groundwater requirements of WAC 173-303-400(3)(a) through (3)(c), "Interim Status Facility Standards," "Standards." However, a certified waiver of groundwater monitoring requirements in accordance with 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Subpart F, "Ground-Water Monitoring," as referenced by WAC 173-303-400 (3)(a), has been generated, demonstrating that there is only a low potential for migration of hazardous contaminants from this unit to groundwater (PNNL 2005, *Basis for Waiver of Groundwater Monitoring Requirements for 207-A South Retention Basin*). This waiver and demonstration is consistent with the basin having remained intact during operations, thereby preventing liquid from entering the soil, and with TSD unit soil sample results indicating that vadose zone contamination does not exist above levels protective of groundwater.

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

This chapter identifies the 207-A South Retention Basin closure strategy and closure performance standards.

6.1 CLOSURE STRATEGY

The 207-A South Retention Basin concrete structures and soils will be clean closed without further physical closure actions. In 2004, TSD unit characterization sampling was completed as a portion of the 200-PW-2/-4 CERCLA OU RI/FS process. The results of the 200-PW-2/-4 remedial investigation sampling and analysis, as identified in the following sections, indicate that no dangerous waste constituents stored in the basin during the period of TSD unit operations (TSD unit constituents) exists in basin soils or on concrete structures above analytical clean-closure standard(s) established in accordance with WAC 173-303-610(2)(b)(i) and (ii), "Closure and Post-Closure," "Closure Performance Standard." Because the clean-closure approach is based on the results of completed sampling and analysis and clean-closure justification discussion presented in this plan, approval of the plan will constitute approval of clean closure. Any further physical activities necessary to complete waste site disposition of non-TSD unit constituents (e.g., radionuclides, past-practice chemical constituents) will occur in conjunction with 200-PW-2/-4 OU activities under Tri-Party Agreement, Chapter 7.0, past-practice processes that are outside the scope of TSD unit closure and that will satisfy RCRA corrective-action requirements of WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste*, Condition II.Y.

6.2 CLOSURE PERFORMANCE STANDARDS

This section identifies clean-closure performance standards for TSD unit soil and structures.

6.2.1 Treatment, Storage, and Disposal Unit Closure Performance Standards

The standards for closure of this TSD unit are in accordance with the requirements of *Hanford Federal Facility Agreement and Consent Order Action Plan* (Ecology et al. 1989b), Section 5.3, directing that Hanford Site interim status TSD unit closures meet cleanup requirements established in accordance with WAC 173-303-610, "Closure and Post-Closure." As required by Tri-Party Agreement, Section 6.3.1, clean closure for disposal units also must demonstrate that TSD unit operations did not adversely impact soil or groundwater. The closure performance standards of WAC 173-303-610(2)(a)(i - iii), "Closure and Post-Closure," "Closure Performance Standard," require the owner or operator of a TSD facility to close the facility in a manner that (1) minimizes the need for further maintenance; (2) controls, minimizes, or eliminates, postclosure escape of dangerous waste, dangerous waste constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere to the extent necessary to protect human health and the environment; and (3) returns the land to the appearance and use of surrounding land areas.

Clean closure, meaning the status of a Hanford Site TSD unit closed to levels prescribed in WAC 173-303-610(2)(b), will meet these performance standards. Clean closure will eliminate the need for future postclosure inspections, monitoring, and maintenance resulting from contamination from TSD unit constituents. Completed sampling and analysis demonstrates the absence of chemical contamination at the 207-A South Retention Basin that could escape during a postclosure period. After clean closure, appearance of the land will be consistent with future land-use determinations for adjacent portions of the 200 Areas as an industrial-exclusive portion of the Hanford Site. Clean closed basin cells could remain until disposition in conjunction with future decommissioning activities that are consistent with the future industrial land-use scenario.

6.2.2 Soil and Concrete Closure Standards

The clean-closure standard for soil and concrete is an analytical standard established to meet the closure performance standards of WAC 173-303-610(2)(a) and the clean-closure requirements of WAC 173-303-610(2)(b)(i and ii) and WAC 173-303-650(6)(a), "Surface Impoundments," "Closure and Post-Closure Care." For this unit, the clean-closure standards for soil are health-based action levels prescribed by WAC 173-303-610(2)(b)(i). These are numerical cleanup levels calculated using WAC 173-340-740(3), "Unrestricted Land Use Soil Cleanup Standards," "Method B Soil Cleanup Levels for Unrestricted Land Use," formulas or Hanford Site background (DOE/RL-92-24, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*,) concentrations, whichever is least restrictive. In accordance with WAC 173-303-610(2)(a)(ii), clean-closure standards for concrete structures are established on a case-by-case basis. For this unit, clean-closure standards for concrete structures also will be the WAC 173-340-740(3) action levels for soil.

The soil and concrete currently qualify for clean closure, because concentrations of TSD unit constituents have been shown by remedial investigation sampling to be below the WAC 173-340-740(3) action levels for soil. Such levels will be verified as achieved upon Ecology acceptance of the results of completed analytical sampling and analysis results described later in this plan.

Closure as prescribed by WAC 173-303-610(2)(b)(i) directs the use of numeric cleanup levels calculated in accordance with WAC 173-340-740(3). This regulation incorporates requirements for consideration of ecological protection [WAC 173-340-740(3)(b)(ii)] and soil vapor ambient air contamination control [WAC 173-340-740(3)(b)(iii)(C)]. However, these protection requirements are not applicable to this TSD unit closure. WAC 173-340-740(3)(b)(ii) directs establishment of soil cleanup levels that do not apply to TSD unit closures based on WAC 173-340-7493(2)(a)(i), "Site-Specific Terrestrial Ecological Evaluation Procedures," "Problem Formulation Step," "The Chemicals of Ecological Concern." Soil vapor ambient air considerations of WAC 173-340-740(3)(b)(iii)(C)(III) pertain to protection of remediation workers from exposure to volatile organic constituent vapors during soil-removal activities. This provision does not apply, because volatile organic constituents are below worker protection standards (i.e., were undetected), and because soil will not be removed for clean closure, no remediation worker exposure pathway exists.

7.0 CLOSURE ACTIVITIES

This section summarizes clean-closure activities for the 207-A South Retention Basin performed as a portion of 200-PW-2 and 200-PW-4 OU RI/FS process. Closure activities included TSD unit physical isolation, borehole drilling, and soil and concrete closure verification sampling and analysis.

7.1 TREATMENT, STORAGE, AND DISPOSAL UNIT PHYSICAL ISOLATION AND BASIN CLEANOUT

To preclude any further discharges to the unit, and in support of TSD unit closure, the basin was physically isolated from receipt of 242-A Evaporator process condensate effluent in 1989. Operations at the 242-A Evaporator were halted in 1989 to begin facility upgrades that would preclude discharges to the ground. At that time, waste began being transferred to the Liquid Effluent Retention Facility (LERF) basins for storage, awaiting future treatment at the 200 Areas Effluent Treatment Facility (ETF).

Blown-in soil and water were removed from the basin in preparation for remedial investigation sampling and were disposed of as low-level waste in accordance with the results of waste-designation sampling.

7.2 TREATMENT, STORAGE, AND DISPOSAL UNIT CLOSURE SAMPLING AND ANALYSIS

This section identifies the 207-A South Retention Basin TSD unit closure characterization activities, comprising borehole drilling, geophysical logging, field screening, and sampling and analysis of concrete cores and borehole soils performed in fiscal years 2003 and 2004. These activities were performed as a portion of the 200-PW-2/-4 OU CERCLA RI/FS process to identify the nature and extent of chemical and radiological contamination in vadose zone soil underlying the basin, in support of OU remedial decision making and RCRA TSD unit closure. The remedial investigation was conducted in accordance with the sampling and analysis plan, Appendix B, of the Work Plan (DOE/RL-2000-60, Rev. 1). Data collected from the basins are presented in the RI Report (DOE/RL-2004-25, Appendix B) and described in Section 7.2.2.2. Work Plan sampling and analysis requirements for TSD unit characterization were arrived at during a data quality objectives process documented in CP-14176, *Remedial Investigation Data Quality Objectives Summary Report for the 200-PW-4 Operable Unit.*

7.2.1 Concrete and Borehole Drilling

At the 207-A South Retention Basin, shallow boreholes C4113 (west cell), C4114 (middle cell), and C4115 (east cell), were drilled through the concrete floor of each basin cell to collect soil

samples for laboratory analysis. Borehole locations are identified in Figure 3. Three push holes, were drilled. C4114 and C4115 were drilled using a combination of Guzzler™ and hand auger methods. At each sample interval, a hand auger was used to collect soil. The Guzzler was used to advance the hole to the next interval, with the final interval at 3.8 to 4.1 m (12.5 to 13.5 ft) below ground surface (bgs) (CP-18666). After reaching total depth, each push hole was decommissioned in accordance with WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells.

7.2.2 Soil and Concrete Sampling and Analysis Activities

Soil and concrete samples underwent field screening and laboratory analysis as identified in this section. Geophysical logging data were not collected for the 207-A South Retention Basin, because this type of logging is not effective in the 4.2-m (14-ft) shallow borehole at this site.

7.2.2.1 Field Screening/Field pH

Soil samples collected from the boreholes were screened in the field for radiological and chemical contaminants to assist in selecting sample points, support worker health and safety, and to provide sample shipping information. Field screening results were documented in field logbooks.

Samples were screened using hand-held vapor analyzers for volatile organic contamination, ammonia, and tributyl phosphate. Volatile organic screening was performed with a photoionization detector. Detection of volatile organic compounds above 5 p/M was used as an indicator of contamination. The pH was determined in the field using pH paper, a pH meter, or both. Soil and concrete samples were screened in the field for alpha and beta-gamma radioactivity above background before they were placed into containers for shipment.

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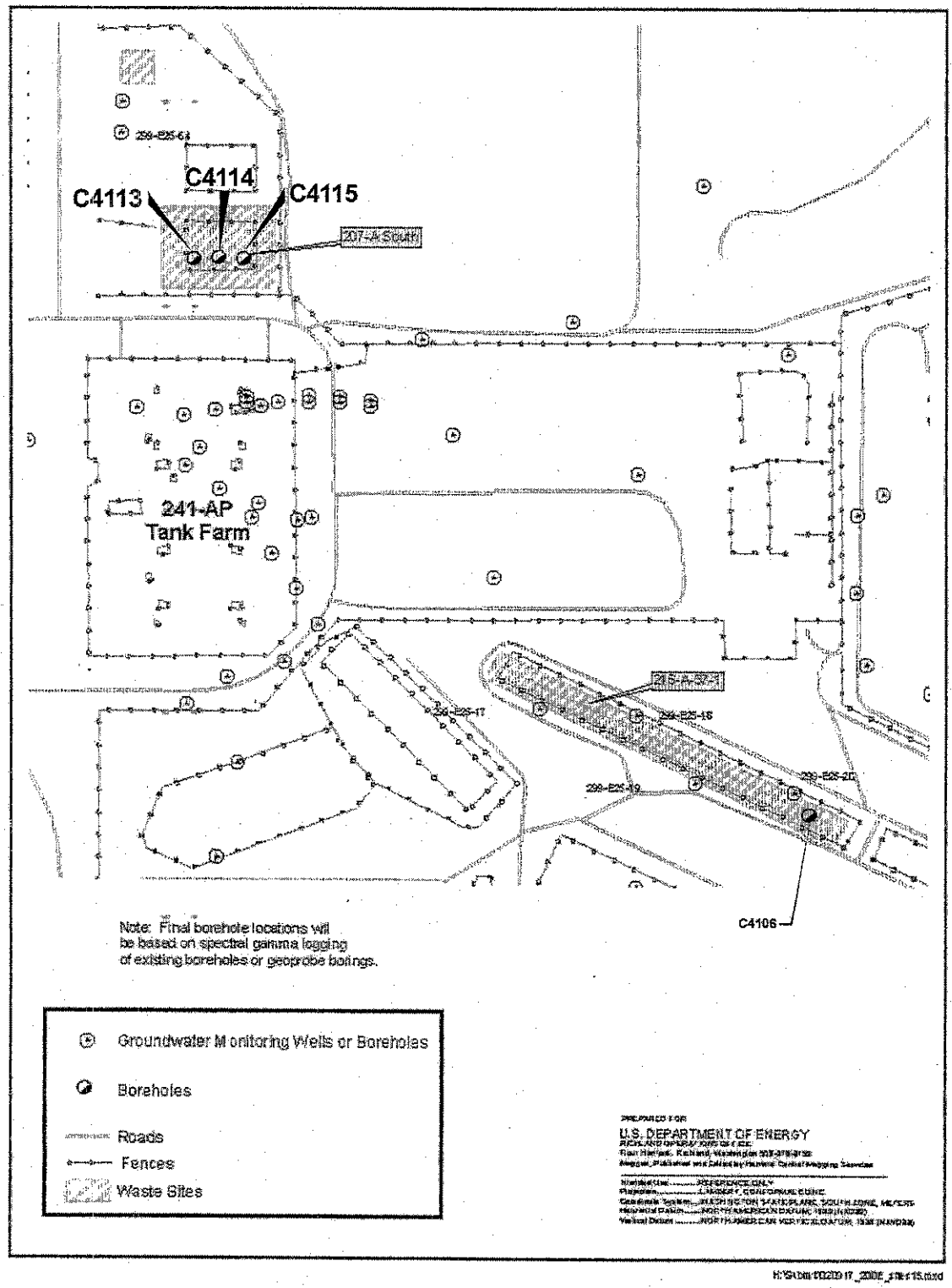
Figure 3. Borehole Locations for the 207-A South Retention Basin.



7.2.2.2 Soil and Concrete Sampling and Analysis

The concrete (and elastomeric lining), borehole vadose zone soils, and blown-in dirt and precipitation collected in the basin since 1989 were sampled. Samples underwent chemical and radiological analysis and determination of physical properties. Samples were collected of the concrete and of soil beneath the lining to a depth of 4.2 m (14 ft) bgs for closure determination. Samples of blown-in soil and water were collected for waste designation purposes, not site characterization. A total of 44 samples were sent for analysis that included quality assurance/quality control (QA/QC) samples, physical property samples, and waste-designation samples. Sample intervals, sample numbers, and analytical results are included in the RI Report (DOE/RL-2004-25, Appendix B).

Separate waste-designation samples were taken of blown-in soil and water (precipitation) in the east, middle, and west cells before the material was removed to begin concrete coring. These were analyzed for a small suite of analytes: metals, gross alpha, gross beta, pH, and total organic carbon. Total organic carbon was measured at 18.9 mg/L. Analytical results are in the RI Report (DOE/RL-2004-25, Appendix B).

Nine concrete samples, three from each basin, were taken and submitted for analysis. Concrete samples were analyzed for parameters identified in the RI Report (DOE/RL-2004-25, Table 2-6). Organic parameters were related to the composition of the elastomer lining the cell surfaces. Analytical data from soil characterization are presented in the RI Report (DOE/RL 2004-25, Appendix B), and results are summarized in the following section.

Twenty-nine soil samples were obtained from the three boreholes from 0.3 to 4.1 m (1.0 to 13.5 ft) bgs. Sample collection was guided by the sample schedule in the Work Plan (DOE/RL-2000-60). Analytical parameters for the OU characterization sampling are summarized in the RI Report (DOE/RL-2004-25, Table 2-6). Soil samples were selectively analyzed for ammonia, anions, hexavalent chromium, total cyanide, metals, nitrate/nitrite, oil and grease, pesticides and herbicides (near-surface soils), pH, polychlorinated biphenyls, volatile organics, semivolatile organics, total petroleum hydrocarbons, radionuclides, and physical properties (e.g., moisture content, particle size distribution, bulk density). Residual concentrations of pesticides and herbicides were tested at 0.3 to 0.6 m (1 to 2 ft) bgs. Analytical data from soil characterization are presented in the RI Report (DOE/RL 2004-25, Appendix B), and the results are summarized in the following section.

7.2.3 Soil and Concrete Sample Results

This section summarizes soil and concrete analytical sample results.

7.2.3.1 Soil Sample Results

Table 1 identifies the maximum concentration of TSD unit constituents from the RI Report (DOE/RL-2004-25, Appendix B) and compares these concentrations to clean-closure levels. No concentration of TSD unit constituents exceeds clean-closure levels in soils. Arsenic, which is not a TSD unit constituent, was detected at slightly above regulated levels, but these

concentrations are discussed below as attributable to natural background. Soil samples detected little chemical or radionuclide contamination in the vadose zone beneath the 207-A South Retention Basin, confirming that the coated concrete effectively protected the soil from contamination.

Arsenic is not a 242-A Evaporator process condensate constituent (WHC-EP-0342, Addendum 15). Arsenic is not listed on the Part A (DOE/RL-88-21) for this unit and is not a TSD unit constituent. Consequently, arsenic is not expected to have originated from TSD unit operations. Arsenic was reported in 10 of 13 samples taken at the 207-A South Retention Basin; therefore, arsenic is prevalent in the site soils. Hanford Site arsenic background levels range from 6.47 mg/kg (90 percent) to 9.06 mg/kg (95 percent upper confidence limit) (DOE/RL-92-24). Of the 10 arsenic detections, 7 were below background levels, 2 were essentially at the low end of the background range at 6.67 mg/kg (0.3 m [1 ft]) and 6.56 mg/kg (0.6 m [2 ft]), and one was slightly above the high end of the background range at 9.98 mg/kg (1.8 m [6 - 7 ft]). The detected concentrations are below or essentially at background, suggesting that arsenic is attributable to natural background. Further, if arsenic had been a constituent of basin waste, it would be prevalent in the soil of the 216-A-37-1 Crib that was the disposal site for basin waste. However, arsenic was found at even lower concentrations in crib soils, further suggesting that arsenic is attributable to natural background.

7.2.3.2 Concrete Sample Results

The RI Report (DOE/RL 2004-25, Appendix B) contains the concrete analytical data. The organics related to the composition of the elastomer cell lining (e.g., xylenes, all benzene derivatives, cresols, naphthalene and its derivatives, isopherone, other ketones) and tributyl phosphate did not exceed concrete analytical clean-closure action levels (Table 1), and none were detected in the soil beneath the basin above clean-closure levels (DOE/RL-2004-25).

7.2.4 Other Activities Necessary During the Closure Period

The duties associated with TSD unit dangerous waste management activities include performing inspections and notifying Ecology of any potential threats to human health and the environment. Following Ecology approval of clean closure, training for dangerous waste management activities at the 207-A South Retention Basin will be discontinued.

Until final closure, TSD unit interim status inspections will continue. Following closure plan approval equating to clean-closure approval (Chapter 6.0), inspections for the 207-A South Retention Basin will be discontinued.

7.3 SCHEDULE FOR CLOSURE

In accordance with Tri-Party Agreement milestone M-020-033 (Ecology et al. 1989a, as amended), submittal of a 207-A South Retention Basin TSD unit closure plan to Ecology is required by April 30, 2006. The closure strategy for this TSD unit is clean closure. Closure activities for this TSD unit, including borehole drilling and vadose zone soil and concrete

sampling and analysis to support this strategy were completed in 2004 (DOE/RL-2004-25). No additional physical closure activities are planned.

7.4 AMENDMENT OF CLOSURE PLAN

As required by WAC 173-303-610(3)(b), "Closure and Post-Closure," "Closure Plan; Amendment of Plan," the closure plan will be amended if changes to closure activities require a modification of the approved closure plan. However, closure activities are complete. If, during the closure plan approval process, an amendment to the approved closure plan is required, the DOE will follow the process contained in RCRA Permit Condition I.C.3, given that the plan has been incorporated into WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste.*

7.5 CERTIFICATION OF CLOSURE

This TSD unit received its last volume of waste in 1989. Closure activities, which comprised borehole drilling and soil and concrete sampling and analysis performed in conjunction with the 200-PW-2/-4 OU CERCLA RI/FS process, were completed in 2004 (DOE/RL-2004-25). This sampling demonstrated the absence of chemical contamination in TSD unit soils and concrete structures above clean-closure levels (Chapter 6.0). Acceptance of these sample results will constitute approval of clean closure and completion of closure.

In accordance with WAC 173-303-610(6), "Closure and Post-Closure," "Certification of Closure," within 60 days of completion of TSD unit closure, the DOE will submit to the lead regulatory agency (Ecology) a certification of closure. Both DOE and the Co-Operator identified on the current Part A permit application (DOE/RL-88-21) will sign the certification of closure, and an independent Registered Professional Engineer will state that the unit has been closed in accordance with the approved closure plan. The certification will be submitted by registered mail or an equivalent delivery service. Documentation supporting the independent Registered Professional Engineer's certification will be placed in the Administrative Record.

8.0 POSTCLOSURE PLAN

The closure strategy for the 207-A South Retention Basin is clean closure with regard to RCRA contaminants from TSD unit operations. Therefore, no postclosure plan for purposes of addressing RCRA contaminants is needed for these sites.

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9.0 REFERENCES

40 CFR 265, Subpart F, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Subpart F, "Ground-Water Monitoring," Title 40, *Code of Federal Regulations*, Part 265, Subpart F, as amended.

Atomic Energy Act of 1954, 42 USC 2011, et seq.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq.

CP-14176, 2003, *Remedial Investigation Data Quality Objectives Summary Report for the 200-PW-4 Operable Unit*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

CP-18666, 2004, *200-PW-2 and 200-PW-4 Operable Unit Borehole Summary Report*, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

DOE/RL-88-21, *Hanford Facility Dangerous Waste Part A Permit Application*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-91-28, 2004, *Hanford Facility Dangerous Waste Permit Application*, Rev. 7, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-92-24, 2001, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, Rev. 3, 2 vols., U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-98-28, 1999, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan – Environmental Restoration Program*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2000-60, 2004, *Uranium-Rich/General Process Condensate and Process Waste Group Operable Units RI/FS Work Plan and RCRA TSD Unit Sampling Plan; Includes 200-PW-2 and 200-PW-4 Operable Units*, Rev. 1, Re-issue, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2004-25, 2004, *Remedial Investigation Report for the 200-PW-2 Uranium-Rich Process Waste Group and 200-PW-4 General Process Condensate Group Operable Units*, Draft A, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1989a, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington, as amended.

Ecology, EPA, and DOE, 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

PNNL, 2005, *Basis for Waiver of Groundwater Monitoring Requirements for 207-A South Retention Basin*, Letter report, Pacific Northwest National Laboratory, Richland, Washington, dated March 8.

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq.

WA7890008967, 2004, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste,* Washington State Department of Ecology, Richland, Washington, as amended.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303-040, "Definitions," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303-400(3), "Dangerous Waste Regulations," "Interim Status Facility Standards," "Standards," *Washington Administrative Code,* as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303-610(2), "Dangerous Waste Regulations," "Closure and Post-Closure," "Closure Performance Standard," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303-610(3), "Dangerous Waste Regulations," "Closure and Post-Closure," "Closure Plan; Amendment of Plan," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303-610(6), "Dangerous Waste Regulations," "Closure and Post-Closure," "Certification of Closure," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-303-650(6)(a), "Dangerous Waste Regulations," "Surface Impoundments," "Closure and Post-Closure Care," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340, "Model Toxics Control Act -- Cleanup," *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-700(6)(d), "Overview of Cleanup Standards," "Requirements for Setting Cleanup Levels," "Natural Background and Analytical Considerations," *Washington Administrative Code,* as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-740(3), "Unrestricted Land Use Soil Cleanup Standards," "Method B Soil Cleanup Levels for Unrestricted Land Use," *Washington Administrative Code,* as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-740(6), "Unrestricted Land Use Soil Cleanup Standards," "Point of Compliance," *Washington Administrative Code,* as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-747, "Deriving Soil Concentrations for Ground Water Protection," *Washington Administrative Code,* as amended, Washington State Department of Ecology, Olympia, Washington.

WAC 173-340-7493(2)(a)(i), "Site-Specific Terrestrial Ecological Evaluation Procedures," "Problem Formulation Step," "The Chemicals of Ecological Concern," *Washington Administrative Code,* as amended, Washington State Department of Ecology, Olympia, Washington.

WHC-EP-0342, 1990, Addendum 15, *242-A Evaporator Process Condensate Stream-Specific Report,* Westinghouse Hanford Company, Richland, Washington.

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